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Technical Report 31

HALEAKALA NATIONAL PARK CRATER DISTRICT
RESOURCES BASIC INVENTORY: INSECTS

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ABSTRACT

The insect fauna of the Crater District of Haleakala National Park was surveyed during the summers of 1975-77. During this period 389 species were collected of which 235 are endemic (60.4%). Eighty-three species are unique to Haleakalā. Two species, the Argentine ant and a ground-nesting yellowjacket, present serious resource management problems. Their eradication is recommended. However, the most beneficial management action for the insect fauna would be the elimination of the feral goat and pig from the area.

RECOMMENDATIONS

1. The feral herbivorous mammals (i.e., goats and pigs) are a continuing threat to the unusual insect fauna of Haleakalā. These mammals should be excluded from all areas of the Park.

2. The Argentine ant is a serious threat to the native insect fauna of the Crater District. Its distribution should be monitored, and further spread of this species should be contained. Hikers should be encouraged to ensure that their packs are free of ants, and materials packed into the crater on horses or flown in by helicopter should also be checked. A very probable mode of infestation would be the fuel boxes, particularly if they are stored in the Park prior to transportation into the field. The current ant population should be destroyed when a suitable agent has been recommended by Western Region.

3. The ground-nesting yellowjacket is a potential threat to the endemic butterflies and moths of the Crater District. The sting is very uncomfortable and a health hazard to humans allergic to their toxins. Nests should be searched for and destroyed.

4. The insect fauna of the alpine cinder desert is extremely sensitive to disturbance. Visitors should be encouraged to remain on the trails and requested not to disturb the rocks.

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INTRODUCTION

The attached Catalog of the Insect Orders of the Crater District of Haleakala National Park is based primarily upon collections made during the summers of 1975-77, during the Resources Basic Inventory (RBI) of the study area. Also listed are certain species collected in the Park before 1975 by the author and others although they were not collected during the RBI. Initial attempts to include all insects previously collected from the area were abandoned because the recorded localities were either too general or very obscure. Some collectors used "Haleakala" on labels of collections from many different areas on the mountain; other collectors used it to refer to the crater on some occasions but not on other occasions. The resolution of these difficulties by reference to field notebooks, etc., was beyond the scope of this project. Species recorded from specific localities definitely within Haleakala National Park, even if not collected during the RBI survey, have been included in the list.

The Catalog is still relatively incomplete. Specimens belonging to certain taxonomic groups have not yet been identified. In other groups, many identifications are still incomplete due to the unavailability of specialists in these groups, or to an inadequate present state of taxonomic knowledge concerning the groups. Relatively complete listings of species have been possible for groups with which the author is most familiar (e.g., the insect orders Homoptera, Hemiptera, and Hymenoptera). As additional identifications are made, or are received from collaborators, this Catalog will be expanded.

The collections made during the 1975-77 RBI study, as well as those which the writer has made in Haleakala National Park prior to the RBI study, are largely from the relatively dry higher elevations of the Park, that is, above 6000 feet elevation. The majority of the species which occur in these areas probably are represented in our collections. However, many important elements of the endemic insect fauna of the Hawaiian Islands are confined to rain forest environments below 6000 feet elevation. These elements are poorly represented in our collections, although a few are present in collections from the Palikū area of the Crater. It is anticipated that collections from rain forest environments within the Park, such as Kīpahulu Valley, will ultimately result in the addition of a great many species to this Catalog.

The arrangement of orders and families follows that used by Zimmerman in the "Insects of Hawaii" series, as far as published. An asterisk before the word Endemic in the last column indicates that, so far as is known, the species is endemic and occurs only on Haleakalā.

METHODS AND MATERIALS

The survey used standard procedures for collecting insects (i.e., light traps, malaise traps, nets, beating vegetation, pit traps, collecting under rocks and in leaf litter). Berlese funnels were not used due to the difficulty of operating this equipment in the field. The omission of this technique is not thought to detract from the completeness of this survey because in the dry summit area leaf litter is not present in significant quantities. The insects were collected principally in the study sites established in the RBI program (Fig. 1) though collections were also made in areas of particular interest to specialists.

STATUS OF THE INSECT FAUNA

Three hundred and eighty-nine species of insects were collected in the Crater District. Two hundred and thirty-five species are endemic to the Hawaiian Islands (Table 1) of which 83 are endemic only to Haleakalā. Thus, 21% of the insects found in the present survey are unique to Haleakalā. The fauna is characterized by many unusual, precinctive (very localized) endemic species including a number of flightless carabid beetles, lacewings, moths, and flies. The high degree of local endemism is quite unusual and illustrates the biological isolation and special character of the area. Therefore, the summit area of this mountain constitutes a very important biological resource which should be protected from disruptive, exotic organisms.

Haleakalā has been surveyed by a number of prominent entomologists. It is not known whether any specimens were collected by the Wilkes Expedition. The Reverend Thomas Blackburn collected beetles and some other insects on Haleakalā 100 years ago; however, the first general collection was made around the turn of the century by R. C. L. Perkins. O. H. Swezey published several papers on Haleakalā insects in the Proceedings of the Hawaiian Entomological Society, and E. C. Zimmerman, originator of the "Insects of Hawaii" series, has worked extensively with Haleakalā insects, particularly with the flightless lacewings. D. E. Hardy has also collected extensively on Haleakalā and has described many species of Diptera (flies) from the area. The insect fauna of Haleakalā is, therefore, fairly well-known and some groups, e.g., beetles, flies, lacewings, moths, etc., have been studied extensively.

The current status of the insect fauna of the area is not very satisfactory. The continued activity of feral goats and pigs is a serious problem. All insects dependent on plants for their food, shelter, etc., are significantly affected by the continuing disruption of the plant communities. The degradation of the plant communities leads to a decrease in the number of plant-feeding insects in the area. These insects are themselves

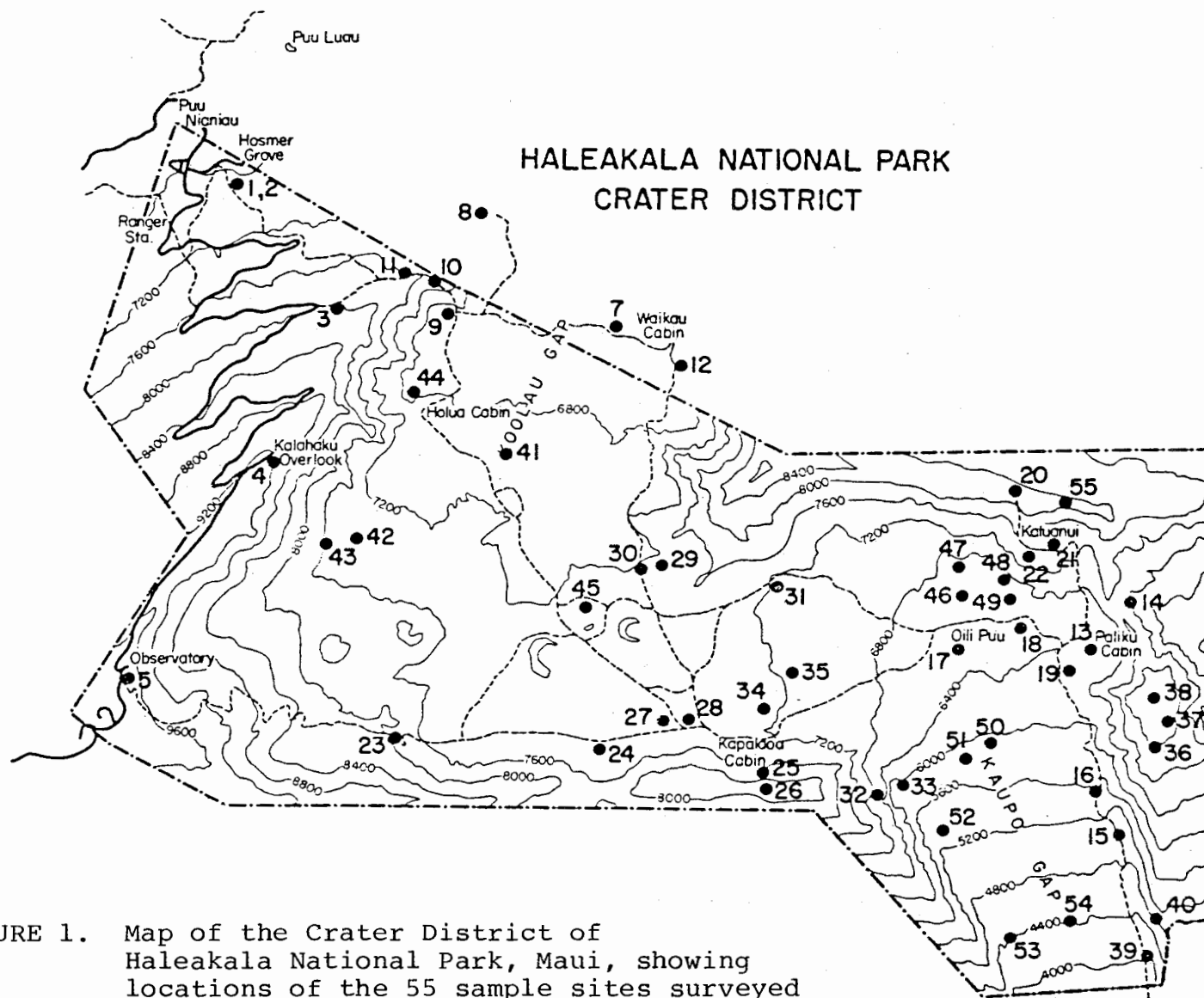


FIGURE 1. Map of the Crater District of Haleakala National Park, Maui, showing locations of the 55 sample sites surveyed during the Resources Basic Inventory-related field work.

TABLE 1. Summary of the number of insects introduced, endemic, and endemic to Haleakalā represented in each order in the fauna of the Crater District.

| Order | Number of Species | | |
|--------------|-------------------|-----------|----------------------|
| | Introduced | Endemic | Endemic to Haleakalā |
| Collembola | 5 | 0 | 0 |
| Odonata | 1 | 3 | 0 |
| Orthoptera | 2 | 1 | 0 |
| Isoptera | 1 | 0 | 0 |
| Dermaptera | 2 | 0 | 0 |
| Thysanoptera | 7 | 1 | 1 |
| Hemiptera | 8 | 33 | 6 |
| Homoptera | 20 | 25 | 9 |
| Coleoptera | 16 | 22 | 12 |
| Neuroptera | 2 | 10 | 3 |
| Lepidoptera | 16 | 33 | 7 |
| Hymenoptera | 41 | 26 | 0 |
| Diptera | <u>33</u> | <u>81</u> | <u>45</u> |
| TOTAL | 154 | 235 | 83 |

| | |
|-----------------------------------|-------------|
| Total Number of Species | = 389 |
| Number of Introduced Species | = 154 (40%) |
| Number of Endemic Species | = 235 (60%) |
| Number of Species Endemic to HALE | = 83 (21%) |

the food of predacious and parasitic species. The endemic entomophagous forms (predators and parasites) are mostly specialized types, largely dependent for their survival upon endemic phytophagous (plant eating) species with which they have coevolved. Destruction of plant communities therefore results not only in the loss of associated plant-feeding arthropods, but also the specialized endemic predators and parasites which prey upon them.

Competition from exotic species which are often more aggressive than the native species can also severely deplete populations. The presence of the ground-nesting yellowjackets, Vespula vulgaris at Hosmer Grove and V. pennsylvanica just outside the Park, are a potential problem. They could outcompete the endemic species of Odynerus (potter wasps) since both are predacious on lepidopteran larvae. The impact of the yellowjackets on the endemic lepidopterans not previously exposed to such an aggressive predator could be disastrous. Both species of yellowjacket are also a potential hazard to visitors and staff in the Park.

The Argentine ant (Iridomyrmex humilis) is another serious threat to the native insect fauna in the Park. A copy of a letter from Dr. J. W. Beardsley to the Superintendent of Haleakala National Park outlining the problem is appended to this report.

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APPENDIX I

A copy of a letter from Dr. J. W. Beardsley
to the Superintendent of Haleakala National Park
outlining the Argentine ant problem.

November 14, 1978

Mr. Hugo Huntzinger, Superintendent
Haleakala National Park
P. O. Box 537
Makawao, Hawaii 96768

Dear Mr. Huntzinger:

Cliff Smith has informed me that he has outlined the problem of the Argentine ant at Haleakala N. P. for you, and has asked me to send you my assessment of the situation and what might be done about it.

The Argentine ant, Iridomyrmex humilis Mayr, is a species which is well adapted to the warmer areas of the temperate climate zones, but does not survive well in the humid tropics. For this reason it is found in Hawaii mostly in areas above 1500 - 2000 feet elevation. The population in the Hosmer's Grove area is at the highest elevation which the species is known to occur in Hawaii. These ants apparently can withstand occasional frosts, but probably will not survive permanently in areas where temperatures remain near or below freezing for prolonged periods. Thus, it seems unlikely to become established at the summit of Haleakala, although at present I do not know how far up the mountain it may extend its range.

The Argentine ant is likely to have a profound effect upon the native biota, particularly insects and other terrestrial arthropods, in those areas in which it becomes permanently established. Like many other dominant and widely distributed ant species, the Argentine ant is omnivorous, but derives a large part of its diet from insect prey. Insects such as the many precinctive, flightless endemic forms which occur on Haleakala are particularly vulnerable to ant predation because of their relatively small, isolated populations and their inability to escape. These endemic species evolved in an environment completely devoid of ants and thus have never developed the means

to cope with ant predation. The British entomologist R.C.L. Perkins, who made the extensive collections which formed the basis for the Fauna Hawaiiensis, was of the opinion that the big-headed ant Pheidole megacephala Fabricius, was largely responsible for the disappearance of many groups of endemic insects from certain lowland areas of Hawaii below elevations of 1500 - 2000 feet. P. megacephala is an aggressive predator, like the Argentine ant, but is a tropical species, rarely found above 2,000 feet in Hawaii. I am concerned that similar extinction of endemic insects may occur on Haleakala due to the activities of the Argentine ant. The Argentine ant also is an aggressive tender of such honeydew producing homopterous insects as aphids, mealybugs and scale insects. We often see large increases in population levels of such insects where Argentine ants are present. Where abundant, such homopterous pests may cause serious damage to their plant hosts. Thus, the presence of Argentine ants in Haleakala could also have an adverse effect upon the endemic flora by causing the buildup of aphids, mealybugs and scale insects.

I believe that research on the ecology of the Argentine ant in Haleakala and its impact on other organisms should be a high priority. We need to delimit the present range of this ant on Haleakala. We should also determine whether it is expanding its range, and if so, how rapidly. It is quite possible that the range of this ant may somehow be limited to areas in close proximity to human habitation, but this remains to be determined. Also we need to assess the populations of endemic arthropods within the area occupied by the Argentine ant, as compared to adjacent areas where the ant is absent, in order to evaluate the impact of the ant on the endemic fauna.

I would also like to take this opportunity to call your attention to another potentially serious ant problem in Haleakala National Park. This involves another ant species, the so called long-legged ant, Anaplolepis longipes (Jerdon), which recently has become extremely abundant in lowland areas of East Maui. Dr. Elmo Hardy of this department, has reported that this ant has virtually exterminated many of the native stream associated insects which were formerly common on the lower portion of Kipahulu Stream. The long-legged ant is a tropical species partial to rocky ground. It has become a serious nuisance problem in East Maui and parts of Hawaii since its accidental introduction a few years ago. Its food habits are similar to those of the Argentine ant, and therefore it must be considered a threat to endemic arthropods in those areas which it successfully establishes. The range and impact of this ant in the Kipahulu area should be evaluated.

For the past several years I have been engaged in research aimed at developing environmentally acceptable methods to control ants in Hawaiian pineapple fields. We are attempting to develop materials and application methods to replace the mirex bait and heptachlor spray applications which have been used up until now,

but which are being phased out due to EPA cancellation actions. We have developed field methods for monitoring ant distribution and numbers which should be applicable to the study of ant populations at Haleakala. We would be happy to assist in any way we can with any ant research and/or control program which may be undertaken at Haleakala.

With very best wishes.

Yours sincerely,

John W. Beardsley
Entomologist & Professor

JWB:ku

CATALOG OF THE INSECT ORDERS
OF THE CRATER DISTRICT OF HALEAKALA NATIONAL PARK

ORDER COLLEMBOLA
(Springtails)

FAMILY ENTOMOBRYIDAE

| | |
|--|------------|
| <u>Entomobrya atrocincta</u> Schoett Scavenger Kaupō trail 5000 ft. | Introduced |
| <u>Entomobrya clitellaria</u> Guthrie Scavenger Hosmer Grove, Halemau'u trailhead 8000 ft. | Introduced |
| <u>Entomobrya nivalis</u> (L.) Scavenger Hosmer Grove, Palikū. | Introduced |
| <u>Entomobryoides purpurasceus</u> (Packard) Scavenger Ainahou in Ko'olau Gap. | Introduced |

FAMILY TOMOCERIDAE

| | |
|--|------------|
| <u>Tomocerus minor</u> (Lubbock) Waikau, Halemau'u trail 6700 ft. | Introduced |
|--|------------|

ORDER ODONATA
(Dragonflies & Damselflies)

FAMILY AESHNIDAE (Darners)

| | |
|------------------------------|------------|
| <u>Anax junius</u> (Drury) | Introduced |
| Predacious | |
| Halemau'u trailhead 8000 ft. | |

FAMILY COENAGRIONIIDAE (Narrow-winged damselflies)

| | |
|---|---------|
| <u>Megalagrion blackburni</u> (McLachlan) | Endemic |
| Predacious | |
| Kalapawili 7500 ft. | |

| | |
|--|---------|
| <u>Megalagrion calliphya</u> (McLachlan) | Endemic |
| Predacious | |
| Hosmer Grove, Palikū. | |

| | |
|--|---------|
| <u>Megalagrion hawaiiensis</u> (McLachlan) | Endemic |
| Predacious | |
| Hosmer Grove. | |

ORDER ORTHOPTERA
(Crickets & Cockroaches)

FAMILY GRYLLIDAE (Crickets)

Metioche vittaticollis (Stal)
Kaupō trail 5000 ft.

Introduced

FAMILY BLATTIDAE (Cockroaches)

Allacta similis (Saussure)
Kaupō Gap 5300 ft.

Introduced

ORDER ISOPTERA
(Termites)

FAMILY KALOTERMITIDAE (Damp-wood termites)

Neotermes connexus Snyder
(forest dampwood termite)
Kaupō Gap 5000 ft.

Introduced

ORDER DERMAPTERA
(Earwigs)

FAMILY FORFICULIDAE

Forficula auricularia L.
(common European earwig)
Scavenger
Hosmer Grove.

Introduced

FAMILY LABIDURIDAE

Euborellia annulipes (Lucas)
(ring-legged earwig)
Scavenger
Hosmer Grove.

Introduced

ORDER THYSANOPTERA
(Thrips)

(Determined by K. Sakimura)

FAMILY AEOLOTHRIPIDAE (Broad-winged or banded thrips)

Aeolothrips nasturtii Jones Introduced
Plant feeder
Kaupō Gap 4800 ft.

FAMILY THRIPIDAE (Common thrips)

Ceratothrips frici (Uzel) Introduced
Plant feeder
Hosmer Grove.

Chirothrips patruelis Hood Introduced
Plant feeder
Hosmer Grove, Kaupō Gap 4800 ft.

Neurisothrips antennatus (Moulton) Introduced
Plant feeder, on 'ōhi'a flowers
Palikū, Kaupō Gap, Hosmer Grove.

Thrips hawaiiensis (Morgan) Introduced
Plant feeder
Kaupō Gap 4800 ft.

Thrips (Isoneurothrips) australis (Bagnell) Introduced
Plant feeder
Hosmer Grove.

FAMILY PHLAEOTHRIPIDAE

Apterygothrips remotus (Bianchi) *Endemic
Plant feeder
Crater rim 10,000 ft.

Haplothrips niger (Osborn) Introduced
Plant feeder
Hosmer Grove, Hōlua.

ORDER HEMIPTERA
(Bugs)

FAMILY PENTATOMIDAE (Stink bugs)

Nezara viridula (L.) Introduced
(southern green stink bug)
Kaupō Gap 5100 ft.

Oechalia pacifica (Stal) Endemic
Predacious
Hosmer Grove, Halemau'u trailhead 8000 ft,
White Hill, Waikau, Palikū,
trail to Kuiki 6400 ft.

FAMILY ALYDNIDAE

Ithmar hawaiiensis Kirkaldy Endemic
Found on pūkiawe
Hosmer Grove, Halemau'u trailhead 8000 ft,
White Hill.

FAMILY LYGAEIDAE (Seed bugs)

Geocoris pallens Stal Introduced
Predacious
White Hill, Palikū.

Metrarga sp. near swezeyi Usinger & Ashlock Endemic
Kaupō trail 5000 ft.

Neseis mauiensis mauiensis (Blackburn) Endemic
Found on mountain pilo and Morinda
Trail to Kuiki 6400 ft.

Neseis ochriasis baldwini Usinger Endemic
Found on māmane
Hosmer Grove, Kaupō trail 5000-5800 ft,
Palikū.

Neseis pallassatus Ashlock *Endemic
Found on Lobelia
Kaupō Gap 6200 ft.

Nesomartis psammophila Kirkaldy Endemic
Found on bunchgrass
Trail to Kuiki 6400 ft, Kapalaoa.

Nysius beardsleyi Ashlock Endemic
Found on 'a'ali'i
Halemau'u trailhead 8000 ft,
Kaupō trail 4600-5700 ft.

| | |
|---|---------|
| <u>Nysius coenosulus</u> Stal Found on kūpaoa White Hill. | Endemic |
| <u>Nysius communis</u> Usinger Found on kūpaoa Hosmer Grove, Halemau'u trailhead 7000-8000 ft, White Hill, Kaupō trail 5000 ft. | Endemic |
| <u>Nysius delectus</u> White Hosmer Grove. | Endemic |
| <u>Nysius kinbergi</u> Usinger Found on kūpaoa White Hill, Waikau Cabin. | Endemic |
| <u>Nysius lichencola</u> Kirkaldy Found on <u>Deschampsia</u> and pūkiawe Halemau'u trailhead 8000 ft, Waikau, Palikū, trail to Kuiki 6400 ft. | Endemic |
| <u>Nysius nemorivagus</u> White Found on kūpaoa White Hill. | Endemic |
| <u>Nysius rubescens</u> White Found on 'ōhelo Hosmer Grove, Waikau, Palikū, trail to Kuiki 6400 ft, Kaupō trail 5000 ft. | Endemic |
| <u>Nysius terrestris</u> Usinger Found on pūkiawe and <u>Chenopodium</u> Halemau'u trailhead 8000 ft, Kaupō trail 5000 ft. | Endemic |
| <u>Nysius</u> sp. near <u>abnormis</u> Usinger Found on pūkiawe Halemau'u trailhead 8000 ft, Kaupō trail 5000-6000 ft. | Endemic |
| <u>Oceanides montivagus</u> Kirkaldy Found on 'ōhi'a Halemau'u trailhead 8000 ft, Palikū, Kaupō trail 5000 ft. | Endemic |

FAMILY NABIDAE (Damsel bugs)

| | |
|--|---------|
| <u>Nabis blackburni</u> White Predacious Hosmer Grove, White Hill, Palikū, Kaupō trail 5800 ft. | Endemic |
|--|---------|

| | |
|---|------------|
| <u>Nabis capsiformis</u> Germar Predacious Hosmer Grove, Halemau'u trailhead 8000 ft, White Hill, Palikū, Kaupō trail 5000 ft. | Introduced |
| <u>Nabis kahavalu</u> (Kirkaldy) Predacious Kaupō Gap. | Endemic |
| <u>Nabis</u> sp. near <u>nubicola</u> (Kirkaldy) Predacious Hosmer Grove, Kalahaku lookout, Palikū. | *Endemic |
| <u>Nabis</u> n. sp, <u>nubicola</u> group Predacious Hosmer Grove, Halemau'u trailhead 8000 ft. | *Endemic |
| FAMILY MIRIDAE (Plant or leaf bugs) | |
| <u>Cyrtopeltis hawaiiensis</u> Kirkaldy Found on kūpaoa White Hill. | Endemic |
| <u>Hyalopeplus pelucidus</u> (Stal) Found on 'a'ali'i White Hill, Kaupō trail 5800 ft. | Introduced |
| <u>Orthotylus perkinsi</u> Kirkaldy Found on māmane Hosmer Grove, Halemau'u trailhead 8000 ft, Palikū, Kaupō trail 5000 ft. | Endemic |
| <u>Orthotylus</u> spp. Found on mountain pilo and 'ōhi'a Hosmer Grove, Halemau'u trailhead 8000 ft, Palikū. | Endemic |
| <u>Psallus</u> sp. Found on sandalwood Halemau'u trailhead 8000 ft. | Endemic |
| <u>Psallus</u> sp. Found on 'a'ali'i Hosmer Grove, Halemau'u trailhead 8000 ft, Kaupō trail 5000 ft. | Endemic |
| <u>Psallus</u> sp. Found on māmane Kaupō trail 5000 ft. | Endemic |
| <u>Pseudoclerada</u> sp. Predacious ? Palikū. | Endemic |

ORDER HOMOPTERA
(Cicadas, Hoppers, Psyllids, Whiteflies, Aphids & Scale Insects)

FAMILY CICADELLIDAE (Leafhoppers)

| | |
|---|------------|
| <u>Balclutha</u> spp. Found on pūkiawe and <u>Deschampsia</u> Waikau, Palikū, trail to Kuiki 6400 ft. | Endemic |
| <u>Carneocephala saggitifera</u> (Uhler) Found on grasses Kaupō Gap 4500-5700 ft. | Introduced |
| <u>Deltocephalus sonorus</u> Ball Found on grasses Kaupō Gap 4500-5500 ft. | Introduced |
| <u>Draeculacephala minerva</u> Ball Found on grasses Palikū. | Introduced |
| <u>Exitianus exitiosus</u> (Uhler) Found on grasses Hōlua, Kaupō Gap 4800 ft. | Introduced |
| <u>Nesophrosyne haleakala</u> Kirkaldy Found on mountain pilo Halemau'u trailhead 8000 ft. | *Endemic |
| <u>Nesophrosyne nuenuē</u> Kirkaldy Found on 'a'ali'i Halemau'u trailhead 8000 ft. | Endemic |
| <u>Nesophrosyne</u> spp. (Unidentified) Various endemic plants Trail to Kuiki 6400 ft. | Endemic |

FAMILY DELPHACIDAE (Planthoppers)

| | |
|---|------------|
| <u>Chloriona kolophron</u> (Kirkaldy) Found on grasses White Hill. | Introduced |
| <u>Leialoha mauiensis</u> (Muir) Found on 'ōhi'a Palikū. | Endemic |
| <u>Nesosydne amaumau</u> (Muir) Found on 'ama'uma'u (<u>Sadleria</u>) Hosmer Grove. | Endemic |
| <u>Nesosydne argyroxiphii</u> Kirkaldy Found on silversword Crater near Bubble Cave. | *Endemic |

| | |
|---|----------|
| <u>Nesosydne geranii</u> (Muir) Found on 'āhinahina Halemau'u trailhead 8000 ft. | *Endemic |
| <u>Nesosydne monticola</u> Kirkaldy Found on mountain pilo Halemau'u trailhead 8000 ft. | *Endemic |
| <u>Nesosydne nigronervus</u> (Muir) Found on pūkiawe Halemau'u trailhead 8000 ft. | *Endemic |
| <u>Nesosydne osborni</u> Muir Found on kūpaoa Kalahaku lookout, White Hill. | *Endemic |
| <u>Nesosydne raillardicola</u> (Muir) Found on kūpaoa Hosmer Grove, trail to Kuiki 6400 ft. | *Endemic |
| <u>Nesosydne tetramolopii</u> (Muir) Found on <u>Tetramolopium</u> White Hill. | *Endemic |
| <u>Nesosydne</u> spp. (Unidentified) Various endemic plants Waikau, Palikū. | Endemic |

FAMILY CIXIIDAE (Cixiid planthoppers)

| | |
|---|---------|
| <u>Oliaris</u> spp. Waikau, Palikū, Kaupō trail 5000 ft. | Endemic |
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FAMILY PSYLLIDAE (Psyllids or jumping plantlice)

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| <u>Hevaheva swezeyi</u> Crawford Found on mokihana (<u>Pelea</u>) | Endemic |
| <u>Kuwayama</u> sp. Found on 'ōhi'a Palikū. | Endemic |
| <u>Psylla uncatoides</u> (Ferris & Klyver) Found on koa Kaupō trail 5000 ft. | Introduced |
| <u>Trioza ohicola</u> Crawford ? Found on 'ōhi'a Hosmer Grove. | Endemic |

FAMILY APHIDIDAE (Aphids or plantlice)

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| <u>Aphis citricola</u> van der Goot Found on 'ūlei Near Hōlua 7200 ft. | Introduced |
| <u>Aphis helichrysis</u> Kaltenback Found on kūpaoa White Hill. | Introduced |
| <u>Aphis oestlundii</u> Gillette Found on evening primrose Hosmer Grove. | Introduced |
| <u>Cinera atlantica</u> (Wilson) Found on <u>Pinus</u> sp. Hosmer Grove. | Introduced |
| <u>Erisoma lanigera</u> (Hausmann) (wooly apple aphid) Found on 'ūlei Near Hōlua 7200 ft. | Introduced |
| <u>Illinoia azaleae</u> (Mason) Found on 'ōhelo White Hill. | Introduced |
| <u>Sitobion miscanthi</u> (Takahashi) Found on grasses Hosmer Grove, Halemau'u trail 6700-8000 ft, Palikū, Kaupō trail 5000-5800 ft, 'Ō'ilipu'u, Kaluanui Crater. | Introduced |
| <u>Tuberolachnus salignus</u> (Gmelin) Found on 'ūlei Near Hōlua 7200 ft. | Introduced |
| <u>Uroleucon pseudambrosia</u> (Olive) Found on gosmore Hosmer Grove. | Introduced |
| <u>Wahlgreniella nervata</u> (Gillette) Found on 'ōhelo Halemau'u trailhead 8000 ft, White Hill. | Introduced |

FAMILY ORTHEZIIDAE (Ensign coccids)

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|---|------------|
| <u>Arctorthezia occidentalis</u> Douglas Found on bunchgrass Halemau'u trailhead 8000 ft. | Introduced |
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FAMILY PSEUDOCOCCIDAE (Mealybugs)

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| <u>Chlorococcus chloris</u> (Beardsley) Found on māmane Kaupō trail 5000 ft. | Endemic |
| <u>Phenacoccus solani</u> Ferris Found on <u>Silene</u> Near bottomless pit 7300 ft. | Introduced |
| <u>Pseudococcus longispinus</u> (Targioni-Tozzetti) (long-tailed mealybug) Found on pūkiawe Hosmer Grove. | Introduced |
| <u>Pseudococcus nudus</u> Ferris Found on kūpaoa, 'ōhelo, and pūkiawe White Hill, Halemau'u trailhead 8000 ft. | Endemic |
| <u>Pseudococcus</u> n. sp. Found on sandalwood Halemau'u trailhead 8000 ft. | Endemic |
| <u>Pseudococcus</u> n. sp. Found on mountain pilo Kapalaoa. | Endemic |
| <u>Tomentocera haleakala</u> Beardsley Found on mountain pilo Kapalaoa. | Endemic |
| <u>Trionymus insularis</u> Ehrhorm Found on <u>Deschampsia</u> Halemau'u trailhead 8000 ft. | Endemic |

FAMILY COCCIDAE (Scale insects)

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|---|------------|
| <u>Saissetia oleae</u> (Olivier) (black scale) Found on kūpaoa and 'ōhelo Hosmer Grove, Park Headquarters, and Waikau. | Introduced |
|---|------------|

ORDER COLEOPTERA
(Beetles)

FAMILY CARABIDAE (Ground beetles)

- Barypristus rupicola (Blackburn) *Endemic
Predacious
Halemau'u trailhead 8000 ft, Kalahaku lookout.
- Bembidion molokaiense (Sharp) Endemic
Predacious
Trail to Kuiki 6400 ft.
- Mauna frigida (Blackburn) *Endemic
Predacious
Halemau'u trailhead 8000 ft, Hōlua, Palikū,
trail to Kuiki 6400 ft.
- Mecyclothorax micans (Blackburn) *Endemic
Halemau'u trailhead 8000 ft, Kalahaku lookout,
Palikū, trail to Kuiki 6400 ft.
- Mecyclothorax montivagus (Blackburn) *Endemic
Halemau'u trailhead 8000 ft, White Hill,
Palikū.
- Mecyclothorax ovipennis Sharp *Endemic
Trail to Kuiki 6400 ft.
- Mecyclothorax perstriatus Sharp *Endemic
Halemau'u trailhead 8000 ft, Waikau.
- Mecyclothorax n. sp. near perkinsi Sharp *Endemic
Trail to Kuiki 6400 ft.
- Mecyclothorax spp. (Unidentified) Endemic
Hosmer Grove, Halemau'u trailhead 8000 ft,
Palikū, trail to Kuiki 6400 ft.

FAMILY DYTISCIDAE (Predaceous diving beetles)

- Rhantus pacificus (Boisduval) Endemic
Aquatic, predacious
Palikū.

FAMILY CERAMBYCIDAE (Long-horned beetles)

- Plagithmysus railliardicola (Perkins) *Endemic
Found on kūpaoa
White Hill.

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| <u>Plagithmysus</u> (<u>Aeschrithmysus</u>) <u>dubautianus</u> Gressitt & Davis Found on kūpaoa 7200 ft (W), White Hill. | *Endemic |
| <u>Plagithmysus</u> (A.) <u>swezeyanus</u> Gress. Summit. | Endemic |
| <u>Plagithmysus</u> (A.) <u>terryi</u> Perkins Found on silversword Crater. | Endemic |
| <u>Plagithmysus</u> (A.?) <u>yoshimotoi</u> Gr. & D. Host uncertain Crater: 'Ō'ilipu'u 6000 ft. | *Endemic |
| <u>Plagithmysus</u> (<u>Neoclytarlus</u>) <u>modestus</u> (Sharp) 3600-4500 ft ? | Endemic |
| <u>Plagithmysus</u> (N.) <u>pennatus</u> (Sh.) 4500-5400 ft ? | Endemic |
| <u>Plagithmysus</u> (N.) <u>railliardiae</u> (Perk.) Found on kūpaoa Summit. | Endemic |
| <u>Plagithmysus</u> (<u>Plagithmysus</u>) <u>cheirodendri</u> Gr. & D. Host uncertain Palikū (also upper Waiho'i Valley). | *Endemic |
| <u>Plagithmysus</u> (P.) <u>funebri</u> Sharp Found on māmane 4500-7200 ft, Hosmer Grove, Halemau'u trailhead 8000 ft, Palikū. | *Endemic |
| <u>Plagithmysus</u> (P.) <u>geranii</u> (Perk.) Found on hinahina 5400-7200 ft (W). | Endemic |
| <u>Plagithmysus</u> sp. Kaupō trail 5000 ft. | Endemic |

FAMILY CHRYSOMOLIDAE (Leaf beetles)

| | |
|---|------------|
| <u>Diachus</u> <u>auratus</u> Le Conte Kaupō Gap 4800 ft. | Introduced |
| <u>Epitrix</u> <u>hirtipennis</u> (Melsheimer) White Hill. | Introduced |

FAMILY STAPHYLINIDAE (Rove beetles)

Creophilus maxillosus L. Introduced
Kapalaoa.

(Unidentified genus & sp.) Endemic ?
Kaupō trail 5000 ft.

FAMILY ANOBIIDAE (Anobiid beetles)

Xyletobius sp. Endemic
Wood borer

FAMILY CIIDAE (Minute tree-fungus beetles)

Cis sp. Endemic
Fungus feeder
Kaupō trail 5000 ft.

FAMILY COCCINELLIDAE (Ladybird beetles)

Coccinella septempunctata bruchii Mulsant Introduced
Predacious on aphids
Hosmer Grove, Halemau'u trailhead 8000 ft,
White Hill, Palikū, Kaupō trail 5800 ft.

Coelophora inaequalis (Fabricius) Introduced
Predacious on aphids
Kaupō Gap 5300 ft.

Cryptolaemus montrouzieri Mulsant Introduced
Predacious on mealybugs and soft scales
Halemau'u trailhead 8000 ft.

Hippodemia convergens Guerin Introduced
Predacious on aphids
Halemau'u trailhead 8000 ft,
Kaupō trail 5800 ft.

Hyperaspis jocosa Mulsant Introduced
Predacious on mealybugs
Halemau'u trailhead 8000 ft, Kalahaku lookout.

Lindorus lophanthae (Blaisdale) Introduced
Predacious on aphids
Halemau'u trailhead 8000 ft.

Olla abdominalis (Say) Introduced
Predacious on aphids
Western rim 9500 ft.

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| <u>Rhizobius ventralis</u> (Erichson) Predacious on aphids Halemau'u trailhead 8000 ft, Kaupō trail 5800 ft. | Introduced |
| <u>Scymnus loewii</u> Mulsant Predacious on aphids and mealybugs Halemau'u trailhead 8000 ft. | Introduced |
| <u>Scymnus notescens</u> (Blaisdale) Predacious on aphids White Hill. | Introduced |
| <u>Stethorus</u> ? sp. Predacious on mites ? White Hill. | Introduced |
| FAMILY HISTERIDAE (Hister beetles) | |
| <u>Saprinus lugens</u> Erichson Kapalaoa. | Introduced |
| FAMILY NITIDULIDAE (Sap beetles) | |
| <u>Nesopeplus</u> sp. Waikau, Palikū. | Endemic |
| <u>Nesoptinus</u> spp. (2) Palikū. | Endemic |
| FAMILY CURCULIONIDAE (Snout beetles) | |
| <u>Apion ulicis</u> Forster Found on gorse and perhaps kūpaoa Halemau'u trailhead 8000 ft. | Introduced |
| <u>Oodemus borrei</u> Blackburn Found on <u>Deschampsia</u> Halemau'u trailhead 8000 ft. | *Endemic |
| <u>Pantomorus cervinus</u> (Boheman) Found on various plants Waikau. | Introduced |
| FAMILY PROTHERINIDAE | |
| <u>Proterhinus</u> spp. (several) Found on various endemic plants White Hill, Palikū, Kaupō trail 5000-5800 ft. | Endemic |

ORDER NEUROPTERA
(Lacewings)

FAMILY CHRYSOPIDAE (Common or green lacewings)

| | |
|---|------------|
| <u>Anomalochrysa fulvescens</u> Perkins Predacious White Hill. | Endemic |
| <u>Anomalochrysa hepatica</u> McLachlan Predacious Kaupō trail 5000 ft. | Endemic |
| <u>Anomalochrysa soror</u> Perkins Predacious Kaupō trail 5000 ft. | Endemic |
| <u>Chrysopa basalis</u> Walker Predacious White Hill. | Introduced |

FAMILY HEMEROBIIDAE (Brown lacewings)

| | |
|---|------------|
| <u>Hemerobius pacificus</u> Banks Predacious Hosmer Grove, Waikau, Kaupō trail 5000 ft. | Introduced |
| <u>Nesomicromus bellulus</u> Perkins Predacious Palikū. | Endemic |
| <u>Nesomicromus haleakalae</u> Perkins Predacious Palikū. | *Endemic |
| <u>Nesomicromus minimus</u> Perkins Predacious Hōlua. | Endemic |
| <u>Nesomicromus rubinervus</u> Perkins Predacious Kaupō Gap 5300 ft. | Endemic |
| <u>Nesomicromus vagus</u> Perkins Predacious Hosmer Grove, Halemau'u trailhead 8000 ft, Waikau, Palikū, Kaupō trail 5000 ft. | Endemic |
| <u>Pseudospectra cookeorum</u> Zimmerman Predacious Western rim 9700 ft. | *Endemic |
| <u>Pseudospectra lobipennis</u> Perkins Predacious Palikū. | *Endemic |

ORDER LEPIDOPTERA
(Butterflies & Moths)

FAMILY GEOMETRIDAE (Measuring worms)

| | |
|---|----------|
| <u>Eupithecia craterias</u> (Meyrick) Larvae predacious Palikū, Kaupō trail 5000 ft. | Endemic |
| <u>Eupithecia monticolans</u> Butler Larvae feed on 'ōhi'a, etc. Hosmer Grove, Halemau'u trailhead 8000 ft, Waikau, Palikū, Kaupō trail 5800 ft. | Endemic |
| <u>Eupithecia scoriodes</u> (Meyrick) Larvae predacious Hosmer Grove, Halemau'u trailhead 8000 ft, Waikau, Palikū, trail to Kuiki 6400 ft. | *Endemic |
| <u>Fletcheriana insularis</u> (Butler) Caught in light trap | Endemic |
| <u>Megalotica aphoristis</u> (Meyrick) Day-flying Palikū. | Endemic |
| <u>Megalotica holombra</u> (Meyrick) Day-flying Hosmer Grove, Waikau, Palikū. | *Endemic |
| <u>Scotorythra</u> sp. Caught in light trap Hosmer Grove, Halemau'u trailhead 8000 ft. | Endemic |
| <u>Scotorythra</u> sp. Caught in light trap Palikū. | Endemic |

FAMILY NOCTUIDAE (Noctuid moths)

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| <u>Achaea janata</u> (L.) Caught in light trap Palikū. | Introduced |
| <u>Agrotis aulacias</u> Mayrick Caught in light trap Halemau'u trailhead 8000 ft. | Endemic |
| <u>Agrotis baliopa</u> Meyrick Caught in light trap Hosmer Grove, Halemau'u trailhead 8000 ft. | Endemic |

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| <u>Agrotis epicremna</u> Meyrick Caught in light trap Halemau'u trailhead 8000 ft, White Hill. | Endemic |
| <u>Agrotis epsilon</u> (Hufnagel) Caught in light trap Hosmer Grove, Halemau'u trailhead 8000 ft. | Introduced |
| <u>Agrotis xiphias</u> Meyrick Caught in light trap Halemau'u trailhead 8000 ft, White Hill. | Endemic |
| <u>Agrotis</u> spp. (Unidentified) Caught in light trap Halemau'u trailhead 8000 ft, White Hill. | Endemic |
| <u>Catabena esula</u> Druce Caught in light trap Palikū. | Introduced |
| <u>Elydna nonagrica</u> (Walker) Caught in light trap Palikū. | Introduced |
| <u>Haliophyle anthracias</u> (Meyrick) Caught in light trap Western rim 9000 ft. | *Endemic |
| <u>Haliophyle ferruginea</u> (Swezey) Caught in light trap Kaupō trail 5000 ft. | *Endemic |
| <u>Haliophyle flavistigma</u> (Warren) Caught in light trap Palikū. | *Endemic |
| <u>Heliothis zea</u> (Boddie) Caught in light trap Palikū. | Introduced |
| <u>Hypena strigata</u> Fabricius Caught in light trap Palikū. | Introduced |
| <u>Leucania striata</u> Leech Caught in light trap Palikū. | Introduced |
| <u>Melipotis indomita</u> Walker Caught in light trap Halemau'u trailhead 8000 ft. | Introduced |
| <u>Peridroma albiorbis</u> (Warren) ? Caught in light trap Halemau'u trailhead 8000 ft. | Endemic |

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| <u>Peridroma cinctipennis</u> (Warren) Caught in light trap Halemau'u trailhead 8000 ft. | Endemic |
| <u>Peridroma coniotis</u> (Hampson) Caught in light trap Halemau'u trailhead 8000 ft. | Endemic |
| <u>Peridroma saucia</u> (Huebner) Caught in light trap Hosmer Grove, Halemau'u trailhead 8000 ft. | Introduced |
| <u>Peridroma selenias</u> (Meyrick) ? Caught in light trap Halemau'u trailhead 8000 ft. | Endemic |
| <u>Plusia biloba</u> (Stevens) Caught in light trap Hosmer Grove, Halemau'u trailhead 8000 ft. | Introduced |
| <u>Pseudaletia dasuta</u> (Hampson) ? Caught in light trap Hosmer Grove, Halemau'u trailhead 8000 ft. | Endemic |
| <u>Pseudaletia unipuncta</u> (Haworth) Caught in light trap Hosmer Grove, Halemau'u trailhead 8000 ft. | Introduced |
| <u>Pseudaletia n. sp.</u> Caught in light trap Halemau'u trailhead 8000 ft. | Endemic |
| <u>Schrankia altivolans</u> (Butler) ? Caught in light trap Palikū. | Endemic |

FAMILY SPHINGIDAE (Hawk moths)

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| <u>Agrius cingulatus</u> (Fabricius) Caught in light trap Halemau'u trailhead 8000 ft. | Introduced |
| <u>Hylas lineata</u> (Fabricius) Caught in light trap Larvae feeding on <u>Oenothera</u> Palikū, Hōlua. | Introduced |

FAMILY NYMPHALIDAE (Brush-footed butterflies)

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| <u>Vanessa virginiensis</u> (Drury) Kuiki 7500 ft. | Introduced |
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FAMILY LYCAENIDAE (Gossamer-winged butterflies)

- Vaga blackburni (Tuley) Endemic
 Larvae on koa and 'a'ali'i
 Hosmer Grove, Waikau, Palikū,
 trail to Kuiki 6400 ft,
 Kaupō trail 5000-5800 ft.

FAMILY PYRALIDAE (Snout moths)

- Oebia heterodoxa (Meyrick) Endemic
 Caught in light trap
 Waikau, Palikū.
- Oebia liopis (Meyrick) Endemic
 Caught in light trap
 Hosmer Grove, Waikau, Palikū.
- Oebia n. sp. Endemic
 Caught in light trap
 Palikū.
- Rhynchephestia rhabdotis Hampson *Endemic
 Found on silversword
 Western crater.
- Scoparia spp. Endemic
 Caught in light trap
 Palikū.
- Uresiphita polygonalis (Dennis & Shiffermueller) Introduced
 Found on māmane
 Hosmer Grove, Halemau'u trailhead 8000 ft,
 Palikū.

FAMILY PTEROPHORIDAE (Plume moths)

- Stenoptilodes littoralis rhynchophora (Meyrick) Introduced?
 Found on 'ōhelo
 Hosmer Grove, Halemau'u trailhead 8000 ft,
 trail to Kuiki 6400 ft.

FAMILY CARPOSINIDAE (Carposinid moths)

- Heterocrossa sp. Endemic
 Hosmer Grove, Waikau, Palikū.

FAMILY XYLORICTIDAE (Stemonid moths)

Hodegia apatella Walsingham *Endemic
Halemau'u trailhead 8000 ft, Kalahaku lookout,
Sliding sands trail.

Thyrocopa sp. Endemic
Paliku, Kaupō trail 5800 ft.

ORDER HYMENOPTERA
(Ants, Wasps, & Bees)

FAMILY ICHNEUMONIDAE (Ichneumons)

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| <u>Algathia rubicunda</u> (Cresson) Parasite of Lepidoptera larvae Halemau'u trailhead 8000 ft, Palikū. | Introduced |
| <u>Barichneumon californicum</u> (Heinrick) Kaupō Gap 5500 ft. | Introduced |
| <u>Coccygomimus punicipes</u> (Cresson) Parasite of Lepidoptera larvae Hosmer Grove, Palikū, Kaupō trail 5800 ft. | Introduced |
| <u>Diadegma blackburni</u> (Cameron) Parasite of Lepidoptera larvae Hosmer Grove, Waikau, Halemau'u trail 7000 ft, Palikū, trail to Kuiki 6400 ft, Kaupō trail 5000 ft. | Introduced |
| <u>Diplazon laetatorius</u> (Fabricius) Parasite of aphidophagous syrphid larvae Hosmer Grove, Kaupō trail 5800 ft. | Introduced |
| <u>Enicospilus (Enicospilus) castaneus</u> Ashmead Parasite of Lepidoptera larvae Palikū. | Endemic |
| <u>Enicospilus (E.) longicornis</u> Ashmead Parasite of Lepidoptera larvae Palikū. | Endemic |
| <u>Enicospilus (E.) molokaiensis</u> Ashmead Kaupō Gap 5400 ft. | Endemic |
| <u>Enicospilus (Eremotyloides) orbitalis</u> (Ashmead) Parasite of Lepidoptera larvae Kaupō trail 5800 ft. | Endemic |
| <u>Enicospilus (Pleuroneurophion)</u> <u>ferrugineus</u> (Perkins) Parasite of Lepidoptera larvae White Hill. | Endemic |
| <u>Gambrus ultimus</u> (Cresson) Parasite of filth-inhabiting syrphid larvae Palikū, Kaupō trail 5800 ft. | Introduced |
| <u>Gelis tenellus</u> (Say) Parasite of <u>Chrysopa</u> larvae Hosmer Grove. | Introduced |

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| <u>Hyposoter exiguae</u> Viereck Parasite of Lepidoptera larvae Waikau, Palikū. | Introduced |
| <u>Pristomerus hawaiiensis</u> Perkins Parasite of Lepidoptera larvae Hosmer Grove, Halemau'u trailhead 8000 ft, Palikū. | Introduced? |
| <u>Pristomerus pacificus applachianus</u> Viereck Parasite of Lepidoptera larvae Palikū. | Introduced |
| <u>Pseudamblyteles kobelei</u> Swezey Parasite of Lepidoptera larvae Halemau'u trailhead 8000 ft, Kaupō trail 5800 ft. | Introduced |
| <u>Pterocormus cupitus</u> (Cresson) Parasite of Lepidoptera larvae Palikū, trail to Kuiki 6400 ft, Kaupō trail 5800 ft. | Introduced |
| <u>Pterocormus purpuripennis</u> Cresson ? Parasite of Lepidoptera larvae Palikū, trail to Kuiki 6400 ft. | Introduced |
| <u>Spolas</u> spp. Parasites of Lepidoptera larvae Trail to Kuiki 6400 ft, Kaupō trail 5800 ft. | Endemic |
| FAMILY BRACONIDAE (Braconids) | |
| <u>Apanteles marginiventris</u> (Cresson) Parasite of Lepidoptera larvae Palikū, Kaupō trail 5800 ft. | Introduced |
| <u>Apanteles militaris</u> Walsh Parasite of Lepidoptera larvae Kaupō trail 5800 ft. | Introduced |
| <u>Apanteles scutellaris</u> Muesebeck Parasite of Lepidoptera larvae Kaupō Gap 4800 ft. | Introduced |
| <u>Aphidius gifuensis</u> Ashmead ? Aphid parasite Halemau'u trailhead 8000 ft, Kaupō trail 5000 ft. | Introduced |
| <u>Aphidius obscuripes</u> Ashmead Aphid parasite Hosmer Grove, Palikū, Kaupō trail from 5000-5800 ft. | Introduced |

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| <u>Aspilota konae</u> (Ashmead) Parasite of fly larvae Kaupō Gap 4800 ft. | Introduced |
| <u>Bracon omiodivorum</u> (Terry) Parasite of Lepidoptera larvae Hōlua. | Introduced |
| <u>Bracon terryi</u> (Bridwell) Parasite of tephritid fly larvae Kalahaku lookout, Palikū, Kaupō trail from 5000-5800 ft. | Introduced |
| <u>Chelonus insularis</u> Cresson Parasite of Lepidoptera larvae Western rim 10,000 ft. | Introduced |
| <u>Doryctes syagrii</u> (Pemberton) Parasite of introduced fern weevil larvae Palikū. | Introduced |
| <u>Horismus</u> sp. Parasite of ? Hōlua Aug. 1962. | Introduced |
| <u>Meteorus laphygmae</u> Viereck Parasite of Lepidoptera larvae Kaupō Gap from 4500-5500 ft. | Introduced |
| <u>Perilitus coccinellae</u> (Schrank) Parasite of adult coccinellid beetle adults 'Ō'ilipu'u. | Introduced |

FAMILY ENCYRTIDAE (Encyrtids)

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| <u>Anagyrus (Nesoanagyrus)</u> spp. Parasites of endemic Pseudococcidae Hosmer Grove, Halemau'u trailhead 8000 ft, Palikū, Kaupō trail 5800 ft. | Endemic |
| <u>Metaphycus lounsburyi</u> (Howard) Parasite of <u>Saissetia</u> scales Halemau'u trailhead 8000 ft. | Introduced |

FAMILY EUPELMIDAE (Eupelmids)

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| <u>Eupelmus</u> spp. Parasites of various endemic insects Hosmer Grove. | Endemic |
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FAMILY EULOPHIDAE (Eulophids)

- Euderus metallicus (Ashmead) Introduced
Parasite of leafmining larvae
Hosmer Grove, Halemau'u trailhead 8000 ft,
Kalahaku lookout, Waikau Cabin, trail to
Kuiki 6400 ft, Kaupō trail from 5000-5800 ft.
- Sympiesis sp. Endemic
Parasite of leafmining larvae
Kalahaku lookout, Kaupō trail 5800 ft.

FAMILY PTEROMALIDAE (Pteromalids)

- Cyrtogaster fuscitarsus Ashmead Introduced
Hosmer Grove, Halemau'u trailhead 8000 ft,
Kaupō trail 5800 ft.
- Habrocytus sp. Introduced
Halemau'u trailhead 8000 ft.
- Pachyneuron syrphi Ashmead Introduced
Parasite of aphidophagous syrphid larvae
Halemau'u trailhead 8000 ft.
- Toxeuma sp. Endemic
Hosmer Grove.

FAMILY MYMARIDAE (Fairy flies)

- Polynema spp. Endemic
Egg parasites of leafhoppers and planthoppers
Hosmer Grove, Halemau'u trailhead 8000 ft,
Palikū, trail to Kuiki 6400 ft.

FAMILY CERAPHRONIDAE (Ceraphronids)

- Lygocerus sp. Introduced
Hyperparasite in aphids
Halemau'u trailhead 8000 ft.

FAMILY SCELIONIDAE (Scelionids)

- Telenomus sp. Endemic ?
Egg parasites
Halemau'u trailhead 8000 ft.

FAMILY CYNIPIDAE (Gall wasps)

Charips brassicae (Ashmead) Introduced
Hyperparasite in aphids
Hosmer Grove, Halemau'u trailhead 8000 ft.

(Unidentified genus & species Endemic
in the subfamily Eucoilinae)
Parasite in fly puparia.

Phanacis taraxaci (Ashmead) Introduced
Stem galls in Hypochaeris radicata
Hosmer Grove, Halemau'u trailhead 8000 ft.

FAMILY BETHYLIDAE (Bethylids)

Seriola spp. Endemic
Parasites on various endemic insect larvae
Hosmer Grove, Halemau'u trailhead 8000 ft,
Kalahaku lookout, Waikau, Palikū,
Kaupō trail 5000 ft.

FAMILY VESPIDAE (Paper wasps, potter wasps, yellowjackets)

Chelodynerus chelifera Perkins Endemic
Hōlua, Pu'u Maile.

Odynerus nivicola Perkins Endemic
Predacious on Lepidoptera larvae
Palikū.

Odynerus nubicola Perkins Endemic
Predacious on Lepidoptera larvae
Halemau'u trailhead 8000 ft, Waikau, Palikū.

Odynerus sociabilis Perkins Endemic
Predacious on Lepidoptera larvae
Hosmer Grove, Halemau'u trailhead 8000 ft,
Waikau, Palikū, trail to Kuiki 6400 ft.

Polistes fuscatus aurifer (Saussure) Introduced
Predacious on Lepidoptera larvae
Palikū.

Vespula pennsylvanica (Saussure) Introduced
(ground-nesting yellowjacket)
This species responsible for recent attacks
on people camping or visiting Hosmer Grove.
Hosmer Grove.

Vespula vulgaris (L.) Introduced
(ground-nesting yellowjacket)
Hosmer Grove.

FAMILY FORMICIDAE (Ants)

Hypoponera opaciceps (Mayr)

Predacious

Hosmer Grove, Kuiki 7500 ft.

Introduced

Iridomyrmex humilis (Mayr)

(Argentine ant)

Predator/scavenger

Hosmer Grove.

Introduced

ORDER DIPTERA
(Flies)

SUBORDER NEMATOCERA (Long-horned flies)

FAMILY CECIDOMYIIDAE (Gall midges)

Lestremia palikuensis Hardy *Endemic
Palikū.

FAMILY CERATOPOGONIDAE (Biting midges)

Forcipomyia (Proforcipomyia) palikuensis Hardy *Endemic
Palikū.

FAMILY CHIRONOMIDAE (Midges)

Calopsectra bryanti Hardy *Endemic
Crater 7000 ft.

Orthocladius (Smittia) mauiensis Hardy Endemic
Halemau'u trail 8000 ft.

FAMILY MYCETOPHILIDAE (Fungus gnats)

Orfelia (Tylparua) cratericola Hardy *Endemic
Palikū.

FAMILY TIPULIDAE (Crane flies)

Limonia perkinsi Grimshaw Endemic
Hosmer Grove, Palikū, Kaupō 6200 ft.

Limonia grimshawi (Alexander) Endemic
Hosmer Grove, Kapalaoa.

SUBORDER BRACHYCERA (Short-horned flies)

FAMILY DOLICHOPODIDAE (Long-legged flies)

Campsicnemus brunnescens Hardy & Kohn *Endemic
Crater.

Campsicnemus diamphidius Hardy & Kohn *Endemic
Paliku.

Campsicnemus mediofloccus Hardy & Kohn *Endemic
Palikū, Kaupō 5000 ft.

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| <u>Eurynogaster vittata</u> Hardy & Kohn Hōlua, Palikū. | *Endemic |
| <u>Chrysotus parthenus</u> Hardy & Kohn Hosmer Grove, Hōlua, Palikū. | Endemic |
| FAMILY STRATIOMYIDAE (Soldier flies) | |
| <u>Neoexaireta spanigera</u> (Wiedemann) Palikū. | Introduced |
| SUBORDER CYCLORRHAPHA (Circular-seamed flies) | |
| FAMILY ANTHOMYZIDAE (Anthomyzid flies) | |
| <u>Hylemya platura</u> (Meigen) Hosmer Grove, Palikū. | Introduced |
| FAMILY ASTEIIDAE (Asteiid flies) | |
| <u>Asteia palikuensis</u> Hardy & Delfinado Palikū, Kaupō Gap. | *Endemic |
| FAMILY CALLIPHORIDAE (Blow flies) | |
| <u>Calliphora vomitoria</u> (L.) Hosmer Grove, Palikū. | Introduced |
| <u>Dyscritomyia grimshawi</u> James (ms.) Hosmer Grove, Palikū. | Endemic |
| <u>Dyscritomyia hawaiiensis</u> Grimshaw Palikū. | Endemic |
| <u>Eucalliphora lilaea</u> (Walker) Palikū, Kaupō 6100 ft. | Introduced |
| <u>Orthellia vividis</u> (Wiedemann) Hosmer Grove, Palikū. | Introduced |
| <u>Phormia regina</u> (Meigen) Palikū. | Introduced |
| FAMILY CHAMAEMYIIDAE (Aphid flies) | |
| <u>Leucopis albipunctata</u> Zetterstet Aphid predator Hosmer Grove, Palikū, Kaupō 6100 ft. | Introduced |

FAMILY DROSOPHILIDAE (Vinegar flies)

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| <u>Antopocerus orthopterus</u> Hardy Palikū. | *Endemic |
| <u>Drosophila acrostichalis</u> Hardy Palikū. | *Endemic |
| <u>Drosophila araiotrichia</u> Hardy Palikū. | Endemic |
| <u>Drosophila artigena</u> Hardy Palikū. | *Endemic |
| <u>Drosophila asketosoma</u> Hardy West rim 8600 ft. | *Endemic |
| <u>Drosophila crassifemur</u> Grimshaw Halemau'u trail 8000 ft, Palikū, Kaupō 6100 ft. | Endemic |
| <u>Drosophila curvitibia</u> Hardy Palikū. | *Endemic |
| <u>Drosophila hirticoxa</u> Hardy Palikū. | *Endemic |
| <u>Drosophila joycei</u> Hardy Palikū. | *Endemic |
| <u>Drosophila lemniscata</u> Hardy Palikū. | *Endemic |
| <u>Drosophila melanoloma</u> Hardy Palikū. | Endemic |
| <u>Drosophila prodita</u> Hardy Palikū. | Endemic |
| <u>Drosophila scolostoma</u> Hardy Palikū. | *Endemic |
| <u>Drosophila seorsa</u> Hardy Palikū. | *Endemic |
| <u>Drosophila stenoptera</u> Hardy Palikū. | *Endemic |
| <u>Drosophila taeniata</u> Hardy Palikū. | *Endemic |
| <u>Drosophila xuthoptera</u> Hardy Palikū. | Endemic |
| <u>Drosophila (Trichotobregma) petalopeza</u> Hardy Palikū. | *Endemic |

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| <u>Idiomyia obscuripes</u> Grimshaw Palikū. | *Endemic |
| <u>Idiomyia picta</u> Grimshaw Palikū. | Endemic |
| <u>Scaptomyza (Alloscaphomyza) buccata</u> Hackman "Crater." | Endemic |
| <u>Scaptomyza (A.) mutica</u> Hardy Hosmer Grove ?, Palikū. | *Endemic |
| <u>Scaptomyza (A.) semiflava</u> Hardy Hōlua. | Endemic |
| <u>Scaptomyza (Bunostoma) bryanti</u> Hackman Kaupō Gap from 5200-6200 ft. | Endemic |
| <u>Scaptomyza (B.) anomala</u> Hardy Hosmer Grove, Kaupō Gap 6000 ft. | Endemic |
| <u>Scaptomyza (Engisscaphomyza) nasalis</u> (Grimshaw) Pu'u Kukui 7500 ft. | Endemic |
| <u>Scaptomyza (Rosenwaldia) abrupta</u> Hackman Palikū, Kaupō Gap 6600 ft. | *Endemic |
| <u>Scaptomyza (R.) mitchelli</u> Hackman Palikū. | Endemic |
| <u>Scaptomyza (Trogloscaphomyza) affinicuspidata</u> Hardy Palikū. | *Endemic |
| <u>Scaptomyza (T.) concinna</u> Hardy Palikū. | *Endemic |
| <u>Scaptomyza (T.) ctenophora</u> Hardy Palikū. | *Endemic |
| <u>Scaptomyza (T.) cuspidata</u> Hardy Palikū. | Endemic |
| <u>Scaptomyza (T.) decepta</u> Kaupō Gap from 6000-6300 ft. | *Endemic |
| <u>Scaptomyza (T.) devexa</u> Hardy Palikū. | *Endemic |
| <u>Scaptomyza (T.) dubautiae</u> Hardy Pu'u Nianiau. | *Endemic |
| <u>Scaptomyza (T.) eurystylata</u> Hardy Palikū. | Endemic |
| <u>Scaptomyza (T.) isopedon</u> Hardy Palikū. | Endemic |

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| <u>Scaptomyza</u> (T.) <u>latitergum</u> Hardy Crater 8000 ft, Palikū. | Endemic |
| <u>Scaptomyza</u> (T.) <u>longipecten</u> subsp. <u>griseonigra</u> Hardy Hōlua, Palikū. | Endemic |
| <u>Scaptomyza</u> (T.) <u>ostensa</u> Hardy Palikū. | *Endemic |
| <u>Scaptomyza</u> (T.) <u>retusa</u> Hardy Palikū. | *Endemic |
| <u>Scaptomyza</u> (T.) <u>robusta</u> Hardy Ko'olau Gap 7100 ft, Palikū. | *Endemic |
| <u>Scaptomyza</u> (T.) <u>setosiloba</u> Hardy Palikū. | *Endemic |
| <u>Scaptomyza</u> (T.) <u>spilota</u> Hardy Hōlua. | *Endemic |
| <u>Scaptomyza</u> (T.) <u>villosa</u> Hardy Palikū. | *Endemic |
| <u>Scaptomyza</u> (T.) <u>palifrons</u> Hackman Kaupō Gap 6000 ft. | *Endemic |
| <u>Scaptomyza</u> (T.) <u>brachycera</u> Hardy Hosmer Grove, Palikū. | *Endemic |
| <u>Scaptomyza</u> (T.) <u>articulata</u> Hardy Kaupō Gap 6100 ft. | Endemic |

FAMILY EPHYDRIDAE (Shore flies)

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| <u>Neoscatella</u> <u>hawaiiensis</u> (Grimshaw) Palikū, Kaupō 6100 ft. | Endemic |
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FAMILY LONGCHOPTERIDAE (Spear-winged flies)

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| <u>Longchoptera</u> <u>furcata</u> (Fallen) Hosmer Grove, West rim 7000 ft, Palikū, Kaupō Gap 6100 ft. | Introduced |
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FAMILY MUSCIDAE (Miscid flies)

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| <u>Fannia</u> <u>canicularis</u> (L.) Palikū. | Introduced |
| <u>Gymnodia</u> <u>arcuata</u> Stein Palikū. | Introduced |

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| <u>Hydrotaea houghi</u> Mallock Hosmer Grove. | Introduced |
| <u>Lispe metatarsalis</u> Thomson Hosmer Grove, Palikū, Kaupō 6100 ft. | Introduced |
| <u>Lispocephala argentifrons</u> Hardy (ms.) Palikū. | Endemic |
| <u>Lispocephala confluens</u> Mallock Palikū. | Endemic |
| <u>Lispocephala dentata</u> Hardy (ms.) Kaupō 6100 ft. | Endemic |
| <u>Lispocephala indecisa</u> Hardy (ms.) Kaupō 5200 ft. | Endemic |
| <u>Lispocephala ocellata</u> Hardy (ms.) Palikū, Kaupō 6100 ft. | Endemic |
| <u>Lispocephala parilis</u> Hardy (ms.) Palikū, Kaupō 6100 ft. | Endemic |
| <u>Lispocephala silvicola</u> Hardy (ms.) Palikū. | Endemic |
| FAMILY PIPUNCULIDAE (Big-headed flies) | |
| <u>Pipunculus haleakalae</u> (Hardy) Palikū. | Endemic |
| <u>Pipunculus juvator melanopodis</u> (Hardy) Hosmer Grove, Palikū. | Endemic |
| <u>Pipunculus megamenus</u> Hardy Western rim 8400 ft, Palikū, Kaupō 6100 ft. | Endemic |
| <u>Pipunculus uluhe</u> (Hardy) Palikū. | Endemic |
| FAMILY SARCOPHAGIDAE (Flesh flies) | |
| <u>Chaetoravinia anandra</u> Dodge Palikū. | Introduced |
| <u>Helicobia morionella</u> (Aldrich) Hōlua. | Introduced |
| <u>Hystricocnema plinthopyga</u> (Wiedemann) Crater. | Introduced |
| <u>Ravania ihermineri</u> (Robineau-Desvoidy) Kapalaoa, Palikū, Kaupō Gap. | Introduced |

FAMILY SEPSIDAE (Black scavenger flies)

Sepsis thoracica (Robineau-Desvoidy) Introduced
Hosmer Grove, Kaupō Gap from 5000-6200 ft.

FAMILY SPHAEROCERIDAE (Small dung flies)

Copromyza equina Fallen Introduced
Hosmer Grove.

Leptocera abdominiseta Duda Introduced
Palikū.

FAMILY SYRPHIDAE (Syrphid or flower flies)

Allograpta exotica (Wiedemann) Introduced
Palikū, Kaupō 5500 ft.

Allograpta obliqua (Say) Introduced
West rim 7600 ft, Palikū, Kaupō 5500 ft.

Eristalis tenax L. Introduced
Pu'u Maile.

Ischiodon grandicornis (Macquart) Introduced
Hosmer Grove, Palikū.

Mesograpta marginata (Say) Introduced
Palikū, Kaupō 5200 ft.

FAMILY TACHINIDAE (Tachinid flies)

Archytas cirphis Curren Introduced
Palikū.

Chaetogaedia monticola (Bigot) Introduced
Kapalaoa, Palikū,
Kaupō Gap from 5000-6200 ft.

Eucelatoria armigera (Coquillet) Introduced
Palikū, Kaupō Gap from 5000-5400 ft.

Gonia longipulvilli Tothill Introduced
Hōlua, Kapalaoa, Palikū, Kaupō Gap 5400 ft.

Lespesia archippivora Riley Introduced
Kaupō 5400 ft.

Leucostoma simplex (Fallen) Introduced
Hosmer Grove, Palikū, Kaupō Gap 5400 ft.

FAMILY TETHINIDAE (Tethinid flies)

Tethinia variseta (Melander) Introduced
Halemau'u trail 8000 ft.

FAMILY TEPHRITIDAE (Fruit flies)

Neotephritis nigropilosa Hardy *Endemic
Hōlua 6500 ft.

Procecidochares utilis Stone Introduced
Hōlua, Kaupō Gap from 5200-6400 ft.

Trupanea artemisae Hardy *Endemic
Near Hōlua 7000 ft, Kaupō 6000 ft.

Trupanea beardsleyi Hardy *Endemic
Kukui ridge 7500 ft, Kaupō 5800 ft.

Trupanea crassipes (Thompson) Endemic
Western rim 7800 ft, Pu'u Maile, Palikū,
Kaupō Gap 5800 ft.

Trupanea cratericola (Grimshaw) *Endemic
Hosmer Grove, West rim 10,000 ft, Palikū,
Kaupō Gap 5200 ft.

Trupanea denotata Hardy *Endemic
West rim 10,000 ft.

Trupanea limpidapex (Grimshaw) *Endemic
West rim from 8000-10,000 ft, Hōlua.

Trupanea pantosticta Hardy Endemic
Palikū.